

ABSTRACT

~~The present invention has been made to provide an optical multiplexer/demultiplexer with a high multiplexing and demultiplexing efficiency. The object is achieved as follows. In an in-plane heterostructure photonic crystal in which vacancies 32 are periodically arranged in each of forbidden band zones 301, 302, with different cycle distances, a waveguide 33 is formed passing through all the forbidden band zones by rendering corresponding vacancies 32 defective in a linear arrangement, and point-like defects 341, 342, . . . are formed by rendering three vacancies 32 in a linear arrangement defective in each of the forbidden band zones. Since, of all light propagating through the waveguide from the light introduction/take-out section 36 and having the frequency 52 demultiplexed from the predetermined point-like defect, the wavelength of light passing through the predetermined point-like defect is not included in transmission bands 51 of the waveguide in the adjacent forbidden band zone, so that the light is reflected on the boundaries 351 and 352 between forbidden band zones and introduced into the point-like defect. Thereby, the demultiplexing efficiency of light with the frequency taken out from the point-like defect is improved. The same applies to the multiplexing efficiency. Light with the predetermined frequency multiplexed from the point-like defect increases the multiplexing efficiency due to increase in intensity of light reaching to the light introduction/takeout section 36 with the help of reflection thereof.~~